45. The covalent conjugate of claim 43, wherein said modifying group and an intact glycosyl linking group precursor are bound as a covalently attached unit to said peptide via the action of an enzyme, said enzyme converting said precursor to said intact glycosyl linking group, thereby forming said conjugate.

46. The covalent conjugate of claim 43 comprising:

a first modifying group covalently bound to a first residue of said peptide via a first intact glycosyl linking group, and

a second glycosyl linking group bound to a second residue of said peptide via a second intact glycosyl linking group.

47. The covalent conjugate of claim 46, wherein said first residue and said second residue are structurally identical.

48. The covalent conjugate of claim 46, wherein said first residue and said second residue have different structures.

49. The covalent conjugate of claim 46 wherein said first residue and said second residue are glycosyl residues.

50. The covalent conjugate of claim 46, wherein said first residue and said second residue are amino acid residues.

51. The covalent conjugate of claim 43, wherein said peptide is remodeled prior to forming said conjugate.

52. The covalent conjugate of claim 51, wherein the remodeled peptide is remodeled to introduce an acceptor moiety for said intact glycosyl linking group.

53. The covalent conjugate of claim 43, wherein said modifying group is a water-soluble polymer.

54. The covalent conjugate of claim 53, wherein said water-soluble polymer comprises poly(ethylene glycol).

55. The covalent conjugate of claim 43, wherein said peptide is selected from the group consisting of granulocyte colony stimulating factor, interferon-alpha, interferon-beta, Factor VIIa, Factor IX, follicle stimulating hormone, erythropoietin, granulocyte macrophage colony stimulating factor, interferon-gamma, alpha-1-protease inhibitor, beta-glucosidase, tissue plasminogen activator protein, interleukin-2, Factor VIII, chimeric tumor necrosis factor receptor, urokinase, chimeric anti-glycoprotein IIb/IIIa antibody, chimeric anti-HER2 antibody, chimeric anti-respiratory syncytial virus antibody, chimeric anti-CD20 antibody, DNase, chimeric anti-tumor necrosis factor antibody, human insulin, hepatitis B sAg, and human growth hormone.

56. The covalent conjugate of claim 43, wherein said intact glycosyl linking unit is a member selected from the group consisting of a sialic acid residue, a Gal residue, a GlcNAc residue and a GalNAc residue.

57. The covalent conjugate of claim 54, wherein said poly(ethylene glycol) has a molecular weight distribution that is essentially homodisperse.

58. A method of forming a covalent conjugate between a polymer and a glycosylated or non-glycosylated peptide, wherein said polymer is conjugated to said peptide via an intact glycosyl linking group interposed between and covalently linked to both said peptide and said polymer, said method comprising:

contacting said peptide with a mixture comprising a nucleotide sugar covalently linked to said polymer and a glycosyltransferase for which said nucleotide sugar is a substrate under conditions sufficient to form said conjugate.

59. The method of claim 58, wherein said polymer is a water-soluble polymer.

60. The method of claim 58, wherein said glycosyl linking group is covalently attached to a glycosyl residue covalently attached to said peptide.

61. The method of claim 58, wherein said glycosyl linking group is covalently attached to an amino acid residue of said peptide.

62. The method of claim 58, wherein said polymer comprises a member selected from the group consisting of a polyalkylene oxide and a polypeptide .

63. The method of claim 62, wherein said polyalkylene oxide is poly(ethylene glycol).

64. The method of claim 63, wherein said poly(ethylene glycol) has a degree of polymerization of from about 1 to about 20,000.

65. The method of claim 64, wherein said polyethylene glycol has a degree of polymerization of from about 1 to about 5,000.

66. The method of claim 65, wherein said polyethylene glycol has a degree of polymerization of from about 1 to about 1,000.

67. The method of claim 58, wherein said glycosyltransferase is selected from the group consisting of sialyltransferase, galactosyltransferase, glucosyltransferase, GalNAc transferase, GlcNAc transferase, fucosyltransferase, and mannosyltransferase.

68. The method of claim 58, wherein said glycosyltransferase is recombinantly produced.

69. The method of claim 68, wherein said glycosyltransferase is a recombinant prokaryotic enzyme.

70. The method of claim 68, wherein said glycosyltransferase is a recombinant eukaryotic enzyme.

71. The method of claim 58, wherein said nucleotide sugar is selected from the group consisting of UDP-glycoside, CMP-glycoside, and GDP-glycoside.

72. The method of claim 71, wherein said nucleotide sugar is selected from the group consisting of UDP-galactose, UDP-galactosamine, UDP-glucose, UDP-glucosamine, UDP-N-acetylgalactosamine, UDP-N-acetylglucosamine, GDP-mannose, GDP-fucose, CMP-sialic acid, CMP-NeuAc.

73. The method of claim 58, wherein said peptide is a therapeutic agent.

74. The method of claim 58, wherein said glycosylated peptide is partially deglycosylated prior to said contacting.

75. The method of claim 58, wherein said intact glycosyl linking group is a sialic acid residue.

76. The method of claim 58, wherein said method is performed in a cell-free environment.

77. The method of claim 58, wherein said covalent conjugate is isolated.

78. The method of claim 77, wherein said covalent conjugate is isolated by membrane filtration.

79. A method of forming a covalent conjugate between a first glycosylated or non-glycosylated peptide, and a second glycosylated or non-glycosylated peptide cojoined by a linker moiety, wherein

said linker moiety is conjugated to said first peptide via a first intact glycosyl linking group interposed between and covalently linked to both said first peptide and said linker moiety, and

said linker moiety is conjugated to said second peptide via a second intact glycosyl linking group interposed between and covalently linked to both said second peptide and said linker moiety;

said method comprising:

(a) contacting said first peptide with a derivative of said linker moiety precursor comprising a precursor of said first intact glycosyl linking group and a precursor of said second intact glycosyl linking group;

(b) contacting the mixture from (a) with a glycosyl transferase for which said precursor of said first glycosyl linking group is a substrate, under conditions sufficient to convert said precursor of said first intact glycosyl linking group into said first intact glycosyl linking group, thereby forming a first conjugate between said linker moiety precursor and said first peptide;

(c) contacting said first conjugate with said second peptide and a glycosyltransferase for which said precursor of said second intact glycosyl group is a substrate under conditions sufficient to convert said precursor of said second intact glycosyl linking group into said second glycosyl linking group, thereby forming said conjugate between said linker moiety and said first glycosylated or non-glycosylated peptide, and said second glycosylated or non-glycosylated peptide.

80. The method of claim 79, wherein said linker moiety comprises a water-soluble polymer.

81. The method of claim 80, wherein said water-soluble polymer comprises poly(ethylene glycol).

82. A method of forming a covalent conjugate between a first glycosylated or non-glycosylated peptide, and a second glycosylated or non-glycosylated peptide cojoined by a linker moiety, wherein

said linker moiety is covalently conjugated to said first peptide, and

said linker moiety is conjugated to said second peptide via an intact glycosyl linking group interposed between and covalently linked to both said second peptide and said linker moiety,

said method comprising:

(a) contacting said first peptide with an activated derivative of said linker moiety comprising;

a reactive functional group of reactivity complementary to a residue on said first peptide, and a precursor of said intact glycosyl linking group,

under conditions sufficient to form a covalent bond between said reactive functional group and said residue, thereby forming a first conjugate; and

(b) contacting said first conjugate with said second peptide and a glycosyltransferase for which said precursor of said intact glycosyl linking group is a substrate, under conditions sufficient to convert said precursor of said intact glycosyl linking group into said intact glycosyl linking group, thereby forming said conjugate between said first glycosylated or non-glycosylated peptide, and said second glycosylated or non-glycosylated peptide cojoined by said linker moiety.

83. The method of claim 82, wherein said linker moiety comprises a water-soluble polymer.

84. The method of claim 83, wherein said water-soluble polymer comprises poly(ethylene glycol).

85. A pharmaceutical composition comprising a pharmaceutically acceptable diluent and a covalent conjugate between a polymer and a glycosylated or non-glycosylated peptide, wherein said polymer is conjugated to said peptide via an intact glycosyl linking group interposed between and covalently linked to both said peptide and said polymer.

86. A composition for forming a conjugate between a peptide and a modified sugar, said composition comprising: an admixture of a modified sugar, a glycosyltransferase,

and a peptide acceptor substrate, wherein said modified sugar has covalently attached thereto a member selected from a polymer, a therapeutic moiety and a biomolecule.

87. A peptide remodeled by the method of claim 1.

88. A pharmaceutical composition comprising the peptide of claim 87.

89. A peptide remodeled by the method of claim 12.

90. A pharmaceutical composition comprising the peptide of claim 89.

91. A peptide remodeled by the method of claim 23.

92. A pharmaceutical composition comprising the peptide of claim 91.

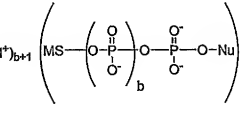
93. A peptide remodeled by the method of claim 30.

94. A pharmaceutical composition comprising the peptide of claim 93.

95. A peptide remodeled by the method of claim 37.

96. A pharmaceutical composition comprising the peptide of claim 95.

97. A compound having the formula:



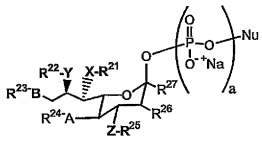
wherein

MS is a modified sugar comprising a sugar covalently bonded to a modifying group;

Nu is a nucleoside; and

b is an integer from 0 to 2.

98. The compound of claim 97, having the formula:



wherein

X, Y, Z, A and B are members independently selected from S, O and NH;

R^{21}, R^{22}, R^{23}, R^{24}, and R^{25} members independently selected from H and a polymer;

R^{26} is a member selected from H, OH, and a polymer;

R^{27} is a member selected from COO^- and Na^+;

Nu is a nucleoside; and

a is an integer from 1 to 3.

99. A cell-free, in vitro method of remodeling a peptide having the formula:

wherein

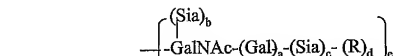
AA is a terminal or internal amino acid residue of said peptide,

said method comprising:

contacting said peptide with at least one glycosyltransferase and at least one glycosyl donor under conditions suitable to transfer said at least one glycosyl donor to said amino acid residue, wherein said glycosyl donor comprises a modifying group, thereby remodeling said peptide.

100. A method of forming a conjugate between a granulocyte colony stimulating factor (G-CSF) peptide and a modifying group, wherein said modifying group is

covalently attached to said G-CSF peptide through an intact glycosyl linking group, said G-CSF peptide comprising a glycosyl residue having the formula:



wherein

a, b, c, and e are members independently selected from 0 and 1;

d is 0; and

R is a modifying group, a mannose or an oligomannose,

said method comprising:

(a) contacting said G-CSF peptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

101. The method of claim 100, further comprising:

(b) prior to step (a), contacting said G-CSF peptide with a sialidase under conditions appropriate to remove sialic acid from said G-CSF peptide.

102. The method of claim 100, further comprising:

(c) prior to step (a), contacting said G-CSF peptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer said galactose to said G-CSF peptide.

103. The method of claim 100, further comprising:

(d) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

104. The method of claim 100, further comprising:

(e) prior to step (a), contacting said G-CSF peptide with N-acetylgalactosamine transferase and a GalNAc donor under conditions appropriate to transfer GalNAc to said G-CSF peptide.

105. The method of claim 100, further comprising:

(f) prior to step (a), contacting said G-CSF peptide with endo-N-acetylgalactosaminidase operating synthetically and a GalNAc donor under conditions appropriate to transfer GalNAc to said G-CSF peptide.

106. The method of claim 100, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

107. The method of claim 100, wherein

a, b, c, and e are 0.

108. The method of claim 100, wherein

a and e are members independently selected from 0 and 1; and

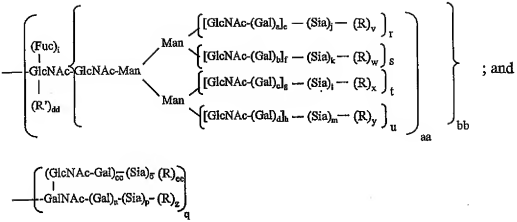
b, c, and d are 0.

109. The method of claim 100, wherein

a, b, c, d, and e are members independently selected from 0 and 1.

110. A G-CSF peptide conjugate formed by the method of claim 100.

111. A method of forming a conjugate between an interferon alpha peptide and a modifying group, wherein said modifying group is covalently attached to said glycopeptide through an intact glycosyl linking group, said glycopeptide comprising a glycosyl residue having a formula selected from:



wherein

a, b, c, d, i, n, o, p, q, r, s, t, u, aa, bb, cc, dd, and ee are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers from 0 to 6;

j, k, l, and m are members independently selected from the integers from 0 to 20;

v, w, x, y, and z are 0; and

R is a modifying group, a mannose or an oligomannose

R' is H, a glycosyl residue, a modifying group, or a glycoconjugate.

said method comprising:

(a) contacting said glycopeptide with a member selected from a glycosyltransferase, an endo-acetylgalactosaminidase operating synthetically and a trans-sialidase, and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

112. The method of claim 111, further comprising:

(b) prior to step (a), contacting said glycopeptide with a sialidase under conditions appropriate to remove sialic acid from said glycopeptide.

113. The method of claim 111, further comprising:

(c) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

114. The method of claim 111, further comprising:

(d) prior to step (a) contacting said glycopeptide with a combination of a glycosidase and a sialidase.

115. The method of claim 111, further comprising:

(e) prior to step (a), contacting said glycopeptide with an endoglycanase under conditions appropriate to cleave a glycosyl moiety from said glycopeptide.

116. The method of claim 111, further comprising:

(f) prior to step (a), contacting said glycopeptide with N-acetylglucosamine transferase and a GlcNAc donor under conditions appropriate to transfer GlcNAc to said glycopeptide.

117. The method of claim 111, further comprising:

(g) prior to step (a), contacting said glycopeptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer galactose to said product.

118. The method of claim 111, further comprising:

(h) prior to step (b), contacting said glycopeptide with endoglycanase under conditions appropriate to cleave a glycosyl moiety from said glycopeptide.

119. The method of claim 111, further comprising:

(i) prior to step (a), contacting said glycopeptide with a mannosidase under conditions appropriate to remove mannose from said glycopeptide.

120. The method of claim 111, further comprising:

(j) contacting the product of step (a) with a sialyltransferase and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

121. The method of claim 111, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

122. The method of claim 111, wherein

a, b, c, d, aa, and bb are 1;

e, f, g, and h are members independently selected from the integers from 1 to 4;

i, j, k, l, m, r, s, t, u, and cc are members independently selected from 0 and 1; and

n, o, p, q, v, w, x, y, z, dd, and ee are 0.

123. The method of claim 111, wherein

a, b, c, d, f, h, j, k, l, m, n, o, p, q, s, u, v, w, x, y, z, cc, dd, and ee are 0;

e, g, i, r, and t are members independently selected from 0 and 1; and

aa and bb are 1.

124. The method of claim 111, wherein

a, b, c, d, e, f, g, i, j, k, l, m, r, s, t, and u are members independently selected from 0 and 1;

h is a member independently selected from the integers from 1 to 3;

dd, v, w, x, and y are 0; and

aa and bb are 1.

125. The method of claim 111, wherein

a, b, c, d, f, h, j, k, l, m, s, u, v, w, x, y, and dd are 0;

e, g, i, r, and t are members independently selected from 0 and 1; and

aa and bb are 1.

126. The method of claim 111, wherein

a, b, c, d, e, f, g, h, i, j, k, l, m, and dd are 0;

r, s, t, u, v, w, x, and y are members independently selected from 0 and 1; and

aa and bb are 1.

127. The method of claim 111, wherein

a, b, c, d, e, f, g, h, i, r, s, t, and u are members independently selected from 0 and 1;

j, k, l, m, v, w, x, y, and dd are 0; and

aa and bb are 1.

128. The method of claim 111, wherein

a, b, c, d, e, f, g, i, j, k, l, m, r, s, t, and u are members independently selected from 0 and 1;

h is a member independently selected from the integers from 1 to 3;

v, w, x, y, and dd are 0; and

aa and bb are 1.

129. The method of claim 111, wherein

a, b, c, d, f, h, j, k, l, m, s, u, v, w, x, y, and dd are 0;

e, g, i, r, and t are members independently selected from 0 and 1; and

aa and bb are 1.

130. The method of claim 111, wherein

n, o, and p are members independently selected from 0 and 1;

q is 1; and

z, cc, and ee are 0.

131. The method of claim 111, wherein

n and q are members independently selected from 0 and 1; and

o, p, z, cc, and ee are 0.

132. The method of claim 111, wherein

n is 0 or 1;

q is 1; and

o, p, z, cc, and ee are 0.

133. The method of claim 111, wherein

n, o, p, and f are members independently selected from 0 and 1;

q is 1; and

z and ee are 0.

134. The method of claim 111, wherein

n, o, p, and q are members independently selected from 0 and 1; and

z, cc, and ee are 0.

135. The method of claim 111, wherein

n and q are members independently selected from 0 and 1; and

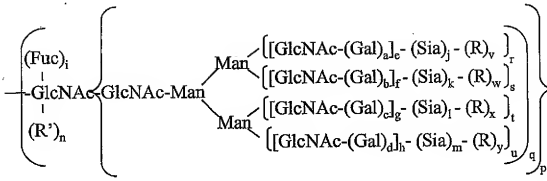
o, p, z, cc, and ee are 0.

136. The method of claim 111, wherein

n, o, p, q, z, cc, and ee are 0.

137. An interferon alpha peptide conjugate formed by the method of claim 111.

138. A method of forming a conjugate between an interferon beta peptide and a modifying group, wherein said modifying group is covalently attached to said interferon beta peptide through an intact glycosyl linking group, said interferon beta peptide comprising a glycosyl residue having the formula:



wherein

a, b, c, d, i, p, q, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers between 0 and 6;

j, k, l, and m are members independently selected from the integers between 0 and 100;

v, w, x, and y are 0;

R is a modifying group, mannose or oligomannose; and

R' is H or a glycosyl, modifying group or glycoconjugate group,

said method comprising:

(a) contacting said interferon beta peptide with a member selected from a glycosyltransferase and a trans-sialidase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

139. The method of claim 138, further comprising:

(b) prior to step (a), contacting said interferon beta peptide with a sialidase under conditions appropriate to remove sialic acid from said interferon beta peptide.

140. The method of claim 138, further comprising:

(c) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

141. The method of claim 138, further comprising:

(d) prior to step (a) contacting said interferon beta peptide with a combination of a glycosidase and a sialidase.

142. The method of claim 138, further comprising:

(e) prior to step (a), contacting said interferon beta peptide with an endoglycanase under conditions appropriate to cleave a glycosyl moiety from said interferon beta peptide.

143. The method of claim 138, further comprising:

(f) prior to step (a), contacting said interferon beta peptide with N-acetylglucosamine transferase and a GlcNAc donor under conditions appropriate to transfer GlcNAc to said interferon beta peptide.

144. The method of claim 138, further comprising:

(g) prior to step (a), contacting said interferon beta peptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer galactose to said product.

145. The method of claim 138, further comprising:

(h) prior to step (b), contacting said interferon beta peptide with endoglycanase under conditions appropriate to cleave a glycosyl moiety from said interferon beta peptide.

146. The method of claim 138, further comprising:

(i) prior to step (a), contacting said interferon beta peptide with a mannosidase under conditions appropriate to remove mannose from said interferon beta peptide.

147. The method of claim 138, further comprising:
(j) contacting the product of step (a) with a sialyltransferase and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

148. The method of claim 138, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

149. The method of claim 138, wherein
h is a member independently selected from the integers between 1 and 3;
a, b, c, d, e, f, g, i, j, k, l, m, r, s, t, and u are members independently selected from 0 and 1;
n, v, w, x, and y are 0; and
q, p are 1.

150. The method of claim 138, wherein
a, b, c, d, f, h, j, k, l, m, n, s, u, v, w, x, and y are 0;
e, g, i, r, and t are members independently selected from 0 and 1; and
q, p are 1.

151. The method of claim 138, wherein
a, b, c, d, e, f, g, h, j, k, l, m, n, r, s, t, u, v, w, x, and y are 0;
q, p are 1; and
i is independently selected from 0 and 1.

152. The method of claim 138, wherein
a, b, c, d, e, f, g, h, I, j, k, l, m, r, s, t, u, v, w, x, and y are 0; and
p, q are 1.

153. The method of claim 138, wherein
a, b, c, d, e, f, g, h, i, j, k, l, m, and n are 0;
q, p are 1; and
r, s, t, u, v, w, x, and y are members independently selected from 0 and 1.

154. The method of claim 138, wherein

a, b, c, d, e, f, g, h, i, r, s, t, and u are members independently selected from 0 and 1;

j, k, l, m, n, v, w, x, and y are 0; and

q, p are 1.

155. The method of claim 138, wherein

a, b, c, d, h, j, k, l, m, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, are members selected from the integers between 0 and 3;

n, v, w, x, and y are 0; and

q, p are 1.

156. The method of claim 138, wherein

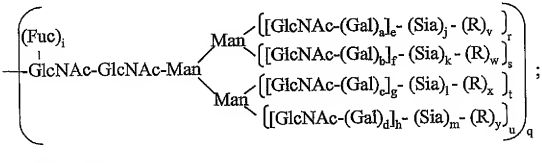
a, b, c, d, i, j, k, l, m, r, s, t, u, p and q are members independently selected from 0 and 1;

e, f, g, and h are 1; and

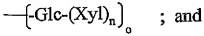
n, v, w, x, and y are 0.

157. An interferon beta peptide conjugate formed by the method of claim 138.

158. A method of forming a conjugate between a Factor VIIa peptide and a modifying group, wherein said modifying group is covalently attached to said Factor VIIa peptide through an intact glycosyl linking group, said Factor VIIa peptide comprising a glycosyl residue having a formula which is a member selected from:



; and



wherein

a, b, c, d, i, o, p, q, r, s, t, and u, are members independently selected from 0 and 1;

e, f, g, h and n are members independently selected from the integers from 0 to 6;

j, k, l and m are members independently selected from the integers from 0 to 20;

v, w, x and y are 0; and

R is a modifying group, a mannose, an oligomannose, SialylLewis^x or SialylLewis^a;

said method comprising:

(a) contacting said Factor VIIa peptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

159. The method of claim 158, further comprising:

(b) prior to step (a), contacting said Factor VIIa peptide with a sialidase under conditions appropriate to remove sialic acid from said Factor VIIa peptide.

160. The method of claim 158, further comprising:

(c) prior to step (a), contacting said Factor VIIa peptide with a galactosidase under conditions appropriate to remove galactose from said Factor VIIa peptide.

161. The method of claim 158, further comprising:

(d) prior to step (a), contacting said Factor VIIa peptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer said galactose to said Factor VIIa peptide.

162. The method of claim 158, further comprising:

(e) contacting the product of step (a) with a sialyltransferase and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

163. The method of claim 158, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

164. The method of claim 158, wherein

a, b, c, d, e, g, i, j, l, o, p and q members independently selected from 0 and 1;

r and t are 1; f, h, k, m, s, u, v, w, x and y are 0; and

n is selected from the integers from 0 to 4.

165. The method of claim 158, wherein

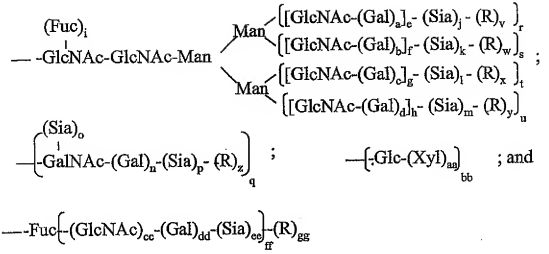
a, b, c, d, e, f, g, h, i, j, k, l, m, n, ,o, p, q, r, s, t and u are members independently selected from 0 and 1;

v, w, x and y are 0; and

n is a member selected from the integers from 0 to 4.

166. A Factor VIIa peptide conjugate formed by the method of claim 158.

167. A method for forming a conjugate between a Factor IX peptide and a modifying group, wherein said modifying group is covalently attached to said Factor IX peptide through an intact glycosyl linking group, said Factor IX peptide comprising a glycosyl residue having a formula which is a member selected from:



wherein

a, b, c, d, i, n, o, p, q, r, s, t, u, bb, cc, dd, ee, ff and gg are members independently selected from 0 and 1;

e, f, g, h and aa are members independently selected from the integers from 0 to 6;

j, k, l and m are members independently selected from the integers from 0 to 20;

v, w, x, y and z are 0;

R is a modifying group, a mannose or an oligomannose;

said method comprising:

(a) contacting said Factor IX peptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

168. The method of claim 167, further comprising:

(b) prior to step (a), contacting said Factor IX peptide with a sialidase under conditions appropriate to remove sialic acid from said Factor IX peptide.

169. The method of claim 167, further comprising:

(c) contacting the product formed in step (a) with a sialyltransferase and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

170. The method of claim 168, further comprising:

(d) contacting the product from step (b) with a galactosyltransferase and a galactose donor under conditions appropriate to transfer said galactose to said product.

171. The method of claim 170, further comprising:

(e) contacting the product from step (d) with ST3Gal3 and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

172. The method of claim 167, further comprising:

(d) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

173. The method of claim 167, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

174. The method of claim 167, wherein

a, b, c, and d are 1;

e, f, g and h are members independently selected from the integers from 1 to 4;

aa, bb, cc, dd, ee, ff, j, k, l, m, i, n, o, p, q, r, s, t and u are members independently selected from 0 and 1; and

v, w, x, y, z and gg are 0.

175. The method of claim 167, wherein

a, b, c, d, n, q are independently selected from 0 and 1;

aa, e, f, g and h are members independently selected from the integers from 1 to 4;

bb, cc, dd, ee, ff, j, k, l, m, i, o, p, r, s, t and u are members independently selected from 0 and 1; and

v, w, x, y, z and gg are 0.

176. The method of claim 167, wherein

a, b, c, d, n, bb, cc, dd and ff are 1;

e, f, g, h and aa are members independently selected from the integers from 1 to 4;

q, ee, i, j, k, l, m, o, p, r, s, t and u are members independently selected from 0 and 1; and

v, w, x, y, z and gg are 0.

177. The method of claim 167, wherein

a, b, c, d and q are 1;

e, f, g and h are members independently selected from the integers from 1 to 4;

aa, bb, cc, dd, ee, ff, j, k, l, m, i, n, o, p, r, s, t and u are members independently selected from 0 and 1; and

v, w, x, y, z and gg are 0.

178. The method of claim 167, wherein

a, b, c, d, q, bb, cc, dd and ff are 1;

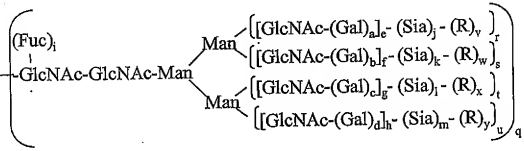
aa, e, f, g and h are members independently selected from the integers from 1 to 4;

ee, i, j, k, l, m, o, p, r, s, t and u are members independently selected from 0 and 1; and

v, w, x, y, z and gg are 0.

179. A Factor IX peptide conjugate formed by the method of claim 167.

180. A method of forming a conjugate between a follicle stimulating hormone (FSH) peptide and a modifying group, wherein said modifying group is covalently attached to said FSH peptide through an intact glycosyl linking group, said FSH peptide comprising a glycosyl residue having the formula:



wherein

a, b, c, d, i, q, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers between 0 and 6;

j, k, l, and m are members independently selected from the integers between 0 and 100;

v, w, x, and y are 0; and

R is a modifying group, a mannose or an oligomannose;

said method comprising:

(a) contacting said FSH peptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

181. The method of claim 180, further comprising:

(b) prior to step (a), contacting said FSH peptide with a sialidase under conditions appropriate to remove sialic acid from said FSH peptide.

182. The method of claim 180, further comprising:

(c) contacting the product of step (a) with a sialyltransferase and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

183. The method of claim 180, further comprising:

(d) prior to step (a), contacting said FSH peptide with a galactosidase under conditions appropriate to remove galactose from said FSH peptide.

184. The method of claim 180, further comrprising:

(e) prior to step (a) contacting said FSH peptide with a combination of a glycosidase and a sialidase.

185. The method of claim 180, further comprising:

(f) prior to step (a), contacting said FSH peptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer said galactose to said FSH peptide.

186. The method of claim 180, further comprising:

(d) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

187. The method of claim 180, further comprising:

(e) prior to step (b), contacting said FSH peptide with an endoglycanase under conditions appropriate to cleave a glycosyl moiety from said FSH peptide.

188. The method of claim 180, further comprising:

(f) prior to step (a), contacting said FSH peptide with N-acetylglucosamine transferase and a GlcNAc donor under conditions appropriate to transfer GlcNAc to said FSH peptide.

189. The method of claim 180, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

190. The method of claim 180, wherein

a, b, c, d, i, j, k, l, m, q, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, and h are 1; and

v, w, x, and y are 0.

191. The method of claim 180, wherein

a, b, c, d, e, f, g, h, i, j, k, l, m, q, r, s, t, and u are members independently selected from 0 and 1;

v, w, x, and y are 0.

192. The method of claim 180, wherein

a, b, c, d, f, h, j, k, l, m , s, u, v, w, x, and y are 0; and

e, g, i, q, r, and t are members independently selected from 0 and 1.

193. The method of claim 180, wherein

a, b, c, d, e, f, g, h, j, k, l, and m are 0;

i, q, r, s, t, u, v, w, x, and y are independently selected from 0 and 1;

p is 1;

R (branched or linear) is a member selected from mannose and oligomannose.

194. The method of claim 180, wherein

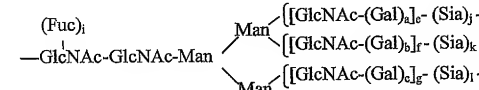
a, b, c, d, e, f, g, h, j, k, l, m, r, s, t, u, v, w, and y are 0;

i is 0 or 1; and

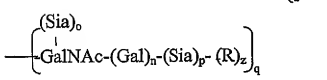
q is 1.

195. A FSH peptide conjugate formed by the method of claim 180.

196. A method for forming a conjugate between an erythropoietin (EPO) peptide and a modifying group, wherein said modifying group is covalently attached to said EPO peptide through an intact glycosyl linking group, said EPO peptide comprising a glycosyl residue having a formula which is a member selected from:



; and



wherein

a, b, c, d, i, n, o, p, q, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers between 0 and 4;

j, k, l, and m are members independently selected from the integers between 0 and 20;

v, w, x, y, and z are 0; and

R is a modifying group, a mannose or an oligomannose;

said method comprising:

(a) contacting said EPO peptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

197. The method of claim 196, further comprising:

(b) prior to step (a), contacting said EPO peptide with a sialidase under conditions appropriate to remove sialic acid from said EPO peptide.

198. The method of claim 196, further comprising:

(c) contacting the product of step (a) with a sialyltransferase and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

199. The method of claim 196, further comprising:

(d) prior to step (a), contacting said EPO peptide with a galactosidase operating synthetically under conditions appropriate to add a galactose to said EPO peptide.

200. The method of claim 196, further comprising:

(e) prior to step (a), contacting said EPO peptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer said galactose to said EPO peptide.

201. The method of claim 200, further comprising:

(f) contacting the product from step (e) with ST3Gal3 and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

202. The method of claim 196, further comprising:

(g) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

203. The method of claim 196, further comprising:

(h) prior to step (a), contacting said EPO peptide with N-acetylglucosamine transferase and a GlcNAc donor under conditions appropriate to transfer GlcNAc to said EPO peptide.

204. The method of claim 196, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

205. The method of claim 196, wherein

a, b, c, d, e, f, g, n, and q are 1;

h is a member selected from the integers between 1 and 3;
i, j, k, l, m, o, p, r, s, t, and u are members independently selected from 0 and 1;
and, v, w, x, y and z are 0.

206. The method of claim 196, wherein
a, b, c, d, f, h, j, k, l, m, q, s, u, v, w, x, y, and z are 0; and
e, g, i, r, and t are members independently selected from 0 and 1.

207. The method of claim 196, wherein
a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, and u are members independently selected from 0 and 1; and
v, w, x, y, and z are 0.

208. The method of claim 196, wherein
a, b, c, d, e, f, g, n, and q are 1;
h is a member selected from the integers between 1 and 3;
i, j, k, l, m, o, p, r, s, t, and u are members independently selected from 0 and 1; and v, w, x, y and z are 0.

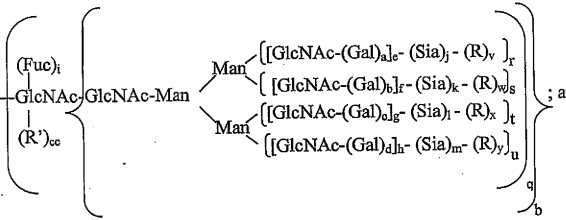
209. The method of claim 196, wherein
a, b, c, d, f, h, j, k, l, m, o, p, s, u, v, w, x, y, and z are 0; and
e, g, i, n, q, r, and t are independently selected from 0 and 1.

210. The method of claim 196, wherein
a, b, c, d, f, h, j, k, l, m, n, o, p, s, u, v, w, x, y, and z are 0; and
e, g, i, q, r, and t are members independently selected from 0 and 1.

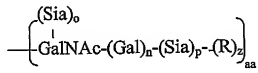
211. The method of claim 196, wherein
q is 1;
a, b, c, d, e, f, g, h, i, n, r, s, t, and u are members independently selected from 0 and 1; and
j, k, l, m, o, p, v, w, x, y, and z are 0.

212. An EPO peptide conjugate formed by the method of claim 196.

213. A method for forming a conjugate between a granulocyte macrophage colony stimulating factor (GM-CSF) peptide and a modifying group, wherein said modifying group is covalently attached to said GM-CSF peptide through an intact glycosyl linking group, said GM-CSF peptide comprising a glycosyl residue having a formula selected from:



; and



wherein

a, b, c, d, i, n, o, p, q, r, s, t, u, aa, bb, and cc are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers between 0 and 6;

j, k, l, and m are members independently selected from the integers between 0 and 100;

v, w, x, and y are 0;

R is a modifying group, mannose or oligomannose; and

R' is H or a glycosyl residue, or a modifying group or a glycoconjugate,

said method comprising:

(a) contacting said GM-CSF peptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a

substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

214. The method of claim 213, further comprising:

(b) prior to step (a), contacting said GM-CSF peptide with a sialidase under conditions appropriate to remove sialic acid from said GM-CSF peptide.

215. The method of claim 213, further comprising:

(c) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

216. The method of claim 213, further comprising:

(d) prior to step (a) contacting said GM-CSF peptide with a combination of a glycosidase and a sialidase.

217. The method of claim 213, further comprising:

(e) prior to step (a), contacting said GM-CSF peptide with an endoglycanase under conditions appropriate to cleave a glycosyl moiety from said GM-CSF peptide.

218. The method of claim 213, further comprising:

(f) prior to step (a), contacting said GM-CSF peptide with N-acetylglucosamine transferase and a GlcNAc donor under conditions appropriate to transfer GlcNAc to said GM-CSF peptide.

219. The method of claim 213, further comprising:

(g) prior to step (a) contacting said GM-CSF peptide with a mannosidase under conditions appropriate to cleave a mannose residue from said GM-CSF peptide.

220. The method of claim 213, further comprising:

(h) prior to step (a), contacting said GM-CSF peptide with ST3Gal3 and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

221. The method of claim 213, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

222. The method of claim 213, wherein

a, b, c, d, i, j, k, l, m, o, p, q, r, s, t, u, and aa are members independently selected from 0 and 1;

bb, e, f, g, h, and n are 1; and

cc, v, w, x, y, and z are 0.

223. The method of claim 213, wherein

a, b, c, d, i, j, k, l, m, o, p, q, r, s, t, u, and aa are members independently selected from 0 and 1;

bb, e, f, g, h, and n are members independently selected from 0 and 1; and

cc, v, w, x, y, and z are 0.

224. The method of claim 213, wherein

cc, a, b, c, d, f, h, j, k, l, m, o, p, s, u, v, w, x, y, and z are 0; and

e, g, i, n, q, r, t, and aa are members independently selected from 0 and 1; and

bb is 1.

225. The method of claim 213, wherein

a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, z and cc are 0;

q, r, s, t, u, v, w, x, y, and aa are members independently selected from 0 and 1; bb is 1; and

R is mannose or oligomannose.

226. The method of claim 213, wherein

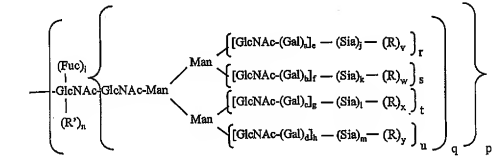
a, b, c, d, e, f, g, h, i, j, k, l, m, o, q, r, s, t, u, aa, and bb are members

independently selected from 0 and 1; and

n, p, v, w, x, y, z, and cc are 0.

227. A GM-CSF peptide conjugate formed by the method of claim 213.

228. A method of forming a conjugate between an interferon gamma peptide and a modifying group, wherein said modifying group is covalently attached to said interferon gamma peptide through an intact glycosyl linking group, said interferon gamma peptide comprising a glycosyl residue having the formula:



wherein

a, b, c, d, i, n, p, q, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers between 0 and 6;

j, k, l, and m are members independently selected from the integers between 0 and 100;

v, w, x, and y are 0;

R is a modifying group, mannose or oligomannose; and

R' is H or a glycosyl residue, a glycoconjugate, or a modifying group,

said method comprising:

(a) contacting said interferon gamma peptide with a member selected from a glycosyltransferase and a galactosidase operating synthetically and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

229. The method of claim 228, further comprising:

(b) prior to step (a), contacting said interferon gamma peptide with a sialidase under conditions appropriate to remove sialic acid from said interferon gamma peptide.

230. The method of claim 228, further comprising:

(c) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

231. The method of claim 228, further comprising:

(d) prior to step (a) contacting said interferon gamma peptide with a combination of a glycosidase and a sialidase.

232. The method of claim 228, further comprising:

(e) prior to step (a), contacting said interferon gamma peptide with an endoglycanase under conditions appropriate to cleave a glycosyl moiety from said interferon gamma peptide.

233. The method of claim 228, further comprising:

(f) prior to step (a), contacting said interferon gamma peptide with N-acetylglucosamine transferase and a GlcNAc donor under conditions appropriate to transfer GlcNAc to said interferon gamma peptide.

234. The method of claim 228, further comprising:

(g) prior to step (a), contacting said interferon gamma peptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer galactose to said product.

235. The method of claim 228, further comprising:

(h) contacting the product of step (a) with a sialyltransferase and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

236. The method of claim 228, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

237. The method of claim 228, wherein

wherein a, b, c, d, i, j, k, l, m, q, p, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, and h are 1; and

n, v, w, x, and y are 0.

238. The method of claim 228, wherein

a, b, c, d, i, j, k, l, m, r, s, t, and u are members independently selected from 0 and 1;

p, q, e, f, g, and h are 1; and

n, v, w, x, and y are 0.

239. The method of claim 228, wherein

a, b, c, d, f, h, j, k, l, m, n, s, u, v, w, x, and y are 0; and

e, g, i, q, r, and t are members independently selected from 0 and 1; and

p is 1.

240. The method of claim 228, wherein

a, b, c, d, e, f, g, h, i, j, k, l, m, and n are 0;

q, r, s, t, u, v, w, x, and y are members independently selected from 0 and 1; and

p is 1; and

R is mannose or oligomannose.

241. The method of claim 228, wherein

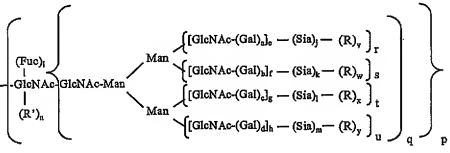
a, b, c, d, i, j, k, l, m, q, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, h, and p are 1; and

n, v, w, x, and y are 0.

242. An interferon gamma peptide conjugate formed by the method of claim 228.

243. A method of forming a conjugate between an alpha 1 protease inhibitor (A-1-PI) peptide and a modifying group, wherein said modifying group is covalently attached to said A-1-PI peptide through an intact glycosyl linking group, said A-1-PI peptide comprising a glycosyl residue having the formula:



wherein

a, b, c, d, i, n, p, q, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers between 0 and 6;

j, k, l, and m are members independently selected from the integers between 0 and 100;

v, w, x, and y are 0;

R is a modifying group, mannose and oligomannose; and

R' is H or a glycosyl residue, a glycoconjugate, or a modifying group; said method comprising:

(a) contacting said A-1-PI peptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

244. The method of claim 243, further comprising:

(b) prior to step (a), contacting said A-1-PI peptide with a sialidase under conditions appropriate to remove sialic acid from said A-1-PI peptide.

245. The method of claim 243, further comprising:

(c) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

246. The method of claim 243, further comprising:

(d) prior to step (a) contacting said A-1-PI peptide with a combination of a glycosidase and a sialidase.

247. The method of claim 243, further comprising:

(e) prior to step (a), contacting said A-1-PI peptide with an endoglycanase under conditions appropriate to cleave a glycosyl moiety from said A-1-PI peptide.

248. The method of claim 243, further comprising:

(f) prior to step (a), contacting said A-1-PI peptide with N-acetylglucosamine transferase and a GlcNAc donor under conditions appropriate to transfer GlcNAc to said A-1-PI peptide.

249. The method of claim 244, further comprising:

(g) prior to step (a), contacting said A-1-PI peptide with a mannosidase under conditions appropriate to remove mannose from said A-1-PI peptide.

250. The method of claim 243, further comprising:

(h) prior to step (a), contacting said A-1-PI peptide with a member selected from a mannosidase, a xylosidase, a hexosaminidase and combinations thereof under conditions appropriate to remove a glycosyl residue from said A-1-PI peptide.

251. The method of claim 243, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

252. The method of claim 243, wherein

a, b, c, d, i, j, k, l, m, q, r, s, t, and u are members independently selected from 0 and 1; and

e, f, g, and h are 1; and n, v, w, x, and y are 0.

253. The method of claim 243, wherein

a, b, c, d, e, f, g, h, i, j, k, l, m, q, r, s, t and u are members independently selected from 0 and 1; and

n, v, w, x, and y are 0.

254. The method of claim 243, wherein

a, b, c, d, f, h, j, k, l, m, n, s, u, v, w, x, and y are 0; and

e, g, i, q, r, and t are members independently selected from 0 and 1.

255. The method of claim 243, wherein

n, a, b, c, d, e, f, g, h, i, j, k, l, and m are 0;

q, r, s, t, u, v, w, x, and y area members independently selected from 0 and 1; and

p is 1.

256. The method of claim 243, wherein

a, b, c, d, e, f, g, h, i, j, k, l, m, n, p, and q are 0;

r, s, t, u, v, w, x, and y are members independently selected from 0 and 1.

257. The method of claim 243, wherein

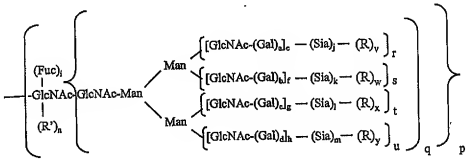
a, b, c, d, e, f, g, h, i, j, k, l, m, r, s, t, and u are members independently selected from 0 and 1;

p, v, w, x, and y are 0; and

n and q are 1.

258. An alpha 1 protease inhibitor peptide conjugate formed by the method of claim 243.

259. A method of forming a conjugate between a beta glucosidase peptide and a modifying group, wherein said modifying group is covalently attached to said beta glucosidase peptide through an intact glycosyl linking group, said beta glucosidase peptide comprising a glycosyl residue having the formula:



wherein

a, b, c, d, i, n, p, q, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers between 0 and 6;

j, k, l, and m are members independently selected from the integers between 0 and 100; and

v, w, x, and y are 0;

R is a modifying group, a mannose or an oligomannose; and

R' is H or a glycosyl residue, a glycoconjugate, or a modifying group,

said method comprising:

(a) contacting said beta glucosidase peptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

260. The method of claim 259, further comprising:

(b) prior to step (a), contacting said beta glucosidase peptide with a sialidase under conditions appropriate to remove sialic acid from said beta glucosidase peptide.

261. The method of claim 259, further comprising:

(c) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

262. The method of claim 259, further comprising:

(d) prior to step (a) contacting said beta glucosidase peptide with a combination of a glycosidase and a sialidase.

263. The method of claim 259, further comprising:

(e) prior to step (a), contacting said beta glucosidase peptide with an endoglycanase under conditions appropriate to cleave a glycosyl moiety from said beta glucosidase peptide.

264. The method of claim 259, further comprising:

(f) prior to step (a), contacting said beta glucosidase peptide with N-acetylglucosamine transferase and a GlcNAc donor under conditions appropriate to transfer GlcNAc to said beta glucosidase peptide.

265. The method of claim 259, further comprising:

(g) prior to step (a), contacting said beta glucosidase peptide with a galactosyl transferase and a galactose donoer under conditions appropriate to transfer galactose to said product.

266. The method of claim 259, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

267. The method of claim 259, wherein

a, b, c, d, i, j, k, l, m, q, r, s, t, and u are members independently selected from 0 and 1;

p, e, f, g, and h are 1; and

n, v, w, x, and y are 0.

268. The method of claim 259, wherein

a, b, c, d, e, f, g, h, i, j, k, l, m, q, r, s, t, and u are members independently selected from 0 and 1; and

n, v, w, x, and y are 0.

269. The method of claim 259, wherein

a, b, c, d, f, h, j, k, l, m, n, s, u, v, w, x, and y are 0;

e, g, i, q, r, and t are members independently selected from 0 and 1; and

p is 1.

270. The method of claim 259, wherein

n, a, b, c, d, e, f, g, h, i, j, k, l, and m are 0;

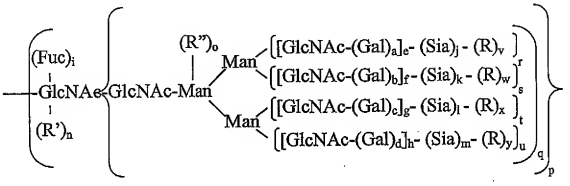
q, r, s, t, u, v, w, x, and y are members independently selected from 0 and 1;

p is 1; and

R is mannose or oligomannose.

271. A beta glucosidase peptide conjugate formed by the method of claim 259.

272. A method of forming a conjugate between a tissue plasminogen activator (TPA) peptide and a modifying group, wherein said modifying group is covalently attached to said TPA peptide through an intact glycosyl linking group, said TPA peptide having a glycosyl subunit comprising the formula:



wherein

a, b, c, d, i, n, o, p, q, r, s, t, u, v, w, x and y are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers from 0 and 6;

j, k, l, and m are members independently selected from the integers from 0 and 100;

R is a modifying group, mannose or oligomannose;

R' is H or a glycosyl residue, a glycoconjugate, or a modifying group; and

R" is a glycosyl group, a glycoconjugate or a modifying group;

said method comprising:

(a) contacting said TPA peptide with a member selected from a glycosyltransferase and a glycosidase operating synthetically and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

273. The method of claim 272, further comprising:

(b) prior to step (a), contacting said TPA peptide with a sialidase under conditions appropriate to remove sialic acid from said TPA peptide.

274. The method of claim 272, further comprising:

(c) contacting the product of step (a) with a sialyltransferase and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

275. The method of claim 272, further comprising:

(d) prior to step (a), contacting said TPA peptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer said galactose to said TPA peptide.

276. The method of claim 272, further comprising:

(e) prior to step (a) contacting said TPA peptide with a combination of a glycosidase and a sialidase.

277. The method of claim 272, further comprising:

(f) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

278. The method of claim 272, further comprising:

(g) prior to step (a), contacting said TPA peptide with N-acetylglucosamine transferase and a GlcNAc donor under conditions appropriate to transfer GlcNAc to said TPA peptide.

279. The method of claim 272, further comprising:

(h) prior to step (a), contacting said TPA peptide with an endoglycanase under conditions appropriate to cleave a glycosyl moiety from said TPA peptide.

280. The method of claim 272, further comprising:

(i) prior to step (a), contacting said TPA peptide with a member selected from a mannosidase, a xylosidase, a hexosaminidase and combinations thereof under conditions appropriate to remove a glycosyl residue from said TPA peptide.

281. The method of claim 272, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

282. The method of claim 272, wherein

a, b, c, d are 1;

e, f, g and h are members selected from the integers between 1 and 3;

i, j, k, l, m, r, s, t, and u are members independently selected from 0 and 1; and

n, o, v, w, x, and y are 0.

283. The method of claim 272, wherein

a, b, c, d, f, h, j, k, l, m, n, o, s, u, v, w, x, and y are 0;

e, g, i, r, and t are members independently selected from 0 and 1; and

q and p are 1.

284. The method of claim 272, wherein

a, b, c, d, e, f, g, h, i, j, k, l, m, p, q, r, s, t, and u are members independently selected from 0 and 1; and

n, o, v, w, x, and y are 0.

285. The method of claim 272, wherein

a, b, c, d, e, f, g, and p are 1;

h is a member selected from the integers between 1 and 3;

j, k, l, m, i, q, r, s, t, and u are members independently selected from 0 and 1; and

n, o, v, w, x, and y are 0.

286. The method of claim 272, wherein

a, b, c, d, f, h, j, k, l, m, n, s, u, v, w, x, and y are 0;

e, g, i, q, r, and t are members independently selected from 0 and 1;

o is 1; and

R" is xylose.

287. The method of claim 272, wherein

a, b, c, d, i, j, k, l, m, q, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, and h are 1; and

n, o, v, w, x, and y are 0.

288. The method of claim 272, wherein

a, b, c, d, e, f, g, h, j, k, l, m, n, r, s, t, u, v, w, x, and y are 0;

i and q are members independently selected from 0 and 1; and

p is 1.

289. The method of claim 272, wherein

a, b, c, d, e, f, g, h, j, k, l, m, o, r, s, t, u, v, w, x, and y are 0;

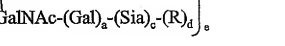
i and q are members independently selected from 0 and 1;

p is 0; and

n is 1.

290. A TPA peptide conjugate formed by the method of claim 272.

291. A method of forming a conjugate between an interleukin 2 (IL-2) peptide and a modifying group, wherein said modifying group is covalently attached to said IL-2 peptide through an intact glycosyl linking group, said IL-2 peptide comprising a glycosyl residue having the formula:



wherein

a, b, c, and e are members independently selected from 0 and 1;

d is 0; and

R is a modifying group,

said method comprising:

(a) contacting said IL-2 peptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

292. The method of claim 291, further comprising:

(b) prior to step (a), contacting said IL-2 peptide with a sialidase under conditions appropriate to remove sialic acid from said IL-2 peptide.

293. The method of claim 291, further comprising:

(c) prior to step (a), contacting said IL-2 peptide with an endo-N-acetylgalactosaminidase operating synthetically under conditions appropriate to add a GalNAc to said IL-2 peptide.

294. The method of claim 291, further comprising:

(d) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

295. The method of claim 291, further comprising:

(e) prior to step (a), contacting said IL-2 peptide with N-acetylgalactosamine transferase and a GalNAc donor under conditions appropriate to transfer GalNAc to said IL-2 peptide.

296. The method of claim 291, further comprising

(f) prior to step (a) contacting said IL-2 peptide with galactosyltransferase and a galactose donor under conditions appropriate to transfer galactose to said IL-2 peptide.

297. The method of claim 291, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

298. The method of claim 291, wherein

a and e are members independently selected from 0 and 1; and

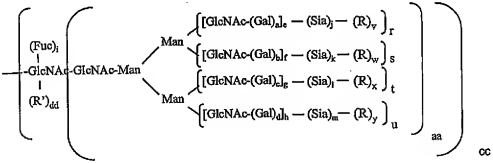
b, c, and d are 0.

299. The method of claim 291, wherein

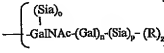
a, b, c, d, and e are 0.

300. An IL-2 peptide conjugate formed by the method of claim 291.

301. A method of forming a conjugate between a Factor VIII peptide and a modifying group, wherein said modifying group is covalently attached to said glycopeptide through an intact glycosyl linking group, said glycopeptide comprising a glycosyl residue having a formula which is a member selected from:



and



wherein

a, b, c, d, i, n, o, p, q, r, s, t, u, aa, cc, and dd are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers between 0 and 6;

j, k, l, and m are members independently selected from the integers between 0 and 20;

v, w, x, y and z are 0; and

R is a modifying group, a mannose or an oligomannose;

R' is a member selected from H, a glycosyl residue, a modifying group and a glycoconjugate,

said method comprising:

(a) contacting said glycopeptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

302. The method of claim 301, further comprising:

(b) prior to step (a), contacting said glycopeptide with a sialidase under conditions appropriate to remove sialic acid from said glycopeptide.

303. The method of claim 301, further comprising:

(c) contacting the product of step (a) with a sialyltransferase and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

304. The method of claim 301, further comprising:

(d) prior to step (a), contacting said glycopeptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer said galactose to said glycopeptide.

305. The method of claim 301, further comprising:

(e) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

306. The method of claim 301, further comprising:

(f) prior to step (a), contacting said glycopeptide with N-acetylglucosamine transferase and a GlcNAc donor under conditions appropriate to transfer GlcNAc to said glycopeptide.

307. The method of claim 301, further comprising:

(g) prior to step (a), contacting said glycopeptide with endoglycanase under conditions appropriate to cleave a glycosyl moiety from said glycopeptide.

308. The method of claim 301, further comprising:

(h) prior to step (a), contacting said glycopeptide with ST3Gal3 and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

309. The method of claim 301, further comprising:

(i) prior to step (a), contacting said glycopeptide with a mannosidase under conditions appropriate to remove mannose from said glycopeptide.

310. The method of claim 301, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

311. The method of claim 301, wherein

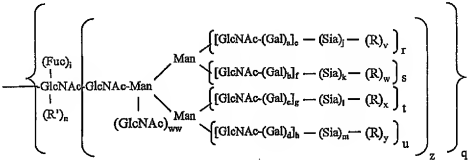
e, f, g, and h are members independently selected from the integers between 1 and 4;

a, b, c, d, i, j, k, l, m, n, o, p, q, r, s, t, u, aa, and cc are members independently selected from 0 and 1; and

v, w, x, y, z, and dd are 0.

312. A Factor VIII peptide conjugate formed by the method of claim 301.

313. A method of forming a conjugate between a tumor necrosis factor (TNF) alpha receptor/IgG fusion peptide and a modifying group, wherein said modifying group is covalently attached to said glycopeptide through an intact glycosyl linking group, said glycopeptide comprising a glycosyl residue having the formula:



wherein

a, b, c, d, i, j, k, l, m, q, r, s, t, u, w, ww, and z are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers between 0 and 4;

n, v, x, and y are 0;

R is a modifying group, a mannose or an oligomannose; and

R' is a member selected from H, a glycosyl residue, a modifying group and a glycoconjugate,

said method comprising:

(a) contacting said glycopeptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

314. The method of claim 313, further comprising:

(b) prior to step (a), contacting said glycopeptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer said galactose to said glycopeptide.

315. The method of claim 313, further comprising:

(c) prior to step (a), contacting said glycopeptide with endoglycanase under conditions appropriate to cleave a glycosyl moiety from said glycopeptide.

316. The method of claim 313, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

317. The method of claim 313, wherein

a, c, i, j, and l are members independently selected from 0 and 1;

e, g, q, r, t, and z are 1; and

b, d, f, h, j, k, l, m, n, s, u, v, w, x, and y are 0.

318. The method of claim 313, wherein

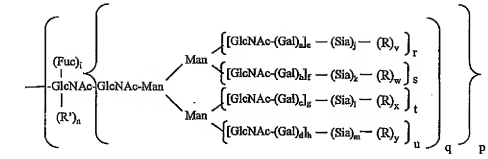
e, g, i, r, and t are members independently selected from 0 and 1

a, b, c, d, f, h, j, k, l, m, n, s, u, v, w, x, and y are 0; and

q and z are 1.

319. A TNF alpha receptor/IgG fusion peptide conjugate formed by the method of claim 313.

320. A method of forming a conjugate between a urokinase peptide and a modifying group, wherein said modifying group is covalently attached to said urokinase peptide through an intact glycosyl linking group, said urokinase peptide comprising a glycosyl residue having the formula:



wherein

a, b, c, d, i, n, p, q, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers between 0 and 6;

j, k, l, and m are members independently selected from the integers between 0 and 100;

v, w, x, and y are 0;

R is a modifying group, a mannose or an oligomannose; and

R' is H or a glycosyl residue, a glycoconjugate, or a modifying group;

said method comprising:

(a) contacting said urokinase peptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

321. The method of claim 320, further comprising:

(b) prior to step (a), contacting said urokinase peptide with a sialidase under conditions appropriate to remove sialic acid from said urokinase peptide.

322. The method of claim 320, further comprising:

(c) contacting the product of step (a) with a sialyltransferase and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

323. The method of claim 320, further comprising:

(d) prior to step (a), contacting said urokinase peptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer said galactose to said urokinase peptide.

324. The method of claim 320, further comprising:

(e) prior to step (a) contacting said urokinase peptide with a combination of a glycosidase and a sialidase.

325. The method of claim 320, further comprising:

(f) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

326. The method of claim 320, further comprising:

(g) prior to step (a), contacting said urokinase peptide with N-acetylglucosamine transferase and a GlcNAc donor under conditions appropriate to transfer GlcNAc to said urokinase peptide.

327. The method of claim 320, further comprising:

(h) prior to step (a), contacting said urokinase peptide with an endoglycanase under conditions appropriate to cleave a glycosyl moiety from said urokinase peptide.

328. The method of claim 320, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

329. The method of claim 320, wherein

a, b, c, d, i, j, k, l, m, q, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, and h are 1;

v, w, x, and y are 0; and

p is 1.

330. The method of claim 320, wherein

a, b, c, d, e, f, g, h, i, j, k, l, m, q, r, s, t, and u are members independently selected from 0 and 1;

n, v, w, x, and y are 0; and

p is 1.

331. The method of claim 320, wherein

a, b, c, d, f, h, j, k, l, m, n, s, u, v, w, x, and y are 0; and

e, g, i, q, r, and t are members independently selected from 0 and 1; and

p is 1.

332. The method of claim 320, wherein

a, b, c, d, e, f, g, h, j, k, l, m, n, r, s, t, u, v, w, x and y are 0;

i is 0 or 1; and

q and p are 1.

333. The method of claim 320, wherein

a, b, c, d, i, j, k, l, m, q, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, and h are independently selected from 0, 1 ,2, 3 and 4; and

n, v, w, x, and y are 0.

334. The method of claim 320, wherein

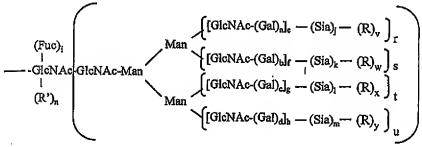
a, b, c, d, e, f, g, h, i, j, k, l, m, o, r, s, t, u, v, w, x and y are 0;

q is1; and

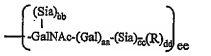
n is 0 or 1.

335. A urokinase peptide conjugate formed by the method of claim 320.

336. A method of forming a conjugate between an anti-glycoprotein IIb/IIIa monoclonal antibody peptide and a modifying group, wherein said modifying group is covalently attached to said glycopeptide through an intact glycosyl linking group, said glycopeptide comprising a glycosyl residue having a formula which is a member selected from:



; and



wherein

a, b, c, d, i, j, k, l, m, r, s, t, u, z, aa, bb, cc, and ee are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers from 0 and 4;

n, v, w, x, y, and dd are 0;

R is a modifying group a mannose or an oligomannose; and

R' is a member selected from H, a glycosyl residue, a modifying group and a glycoconjugates,

said method comprising:

(a) contacting said glycopeptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

337. The method of claim 336, further comprising:

(b) prior to step (a), contacting said glycopeptide with a sialidase under conditions appropriate to remove sialic acid from said glycopeptide.

338. The method of claim 336, further comprising:

(c) contacting the product of step (a) with a sialyltransferase and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

339. The method of claim 336, further comprising:

(d) prior to step (a), contacting said glycopeptide with a galactosidase operating synthetically under conditions appropriate to add a galactose to said glycopeptide.

340. The method of claim 336, further comprising:

(e) prior to step (a), contacting said glycopeptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer said galactose to said glycopeptide.

341. The method of claim 340, further comprising:

(f) contacting the product from step (e) with ST3Gal3 and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

342. The method of claim 336, further comprising:

(g) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

343. The method of claim 336, further comprising:

(h) prior to step (a), contacting said glycopeptide with N-acetylglucosamine transferase and a GlcNAc donor under conditions appropriate to transfer GlcNAc to said glycopeptide.

344. The method of claim 336, further comprising:

(i) prior to step (a), contacting said glycopeptide with endoglycanase under conditions appropriate to cleave a glycosyl moiety from said glycopeptide.

345. The method of claim 336, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

346. The method of claim 336, wherein

a, b, c, d, e, f, g, h, i, j, k, l, m r, s, t, and u are members independently selected from 0 and 1;

n, v, w, x, and y are 0; and

z is 1.

347. The method of claim 336, wherein

a, b, c, d, e, f, g, h, j, k, l, m, n, s, t, u, v, w, x, and y are 0;

i and r are members independently selected from 0 and 1; and

z is 1.

348. The method of claim 336, wherein

a, b, c, d, e, f, g, h, i, j, k, l, m, and n are 0;

r, s, t, u, v, w, x, and y are members independently selected from 0 and 1; and

z is 1.

349. The method of claim 336, wherein

aa, bb, cc, and ee are members independently selected from 0 and 1; and

dd is 0.

350. The method of claim 336, wherein

aa and ee are members independently selected from 0 and 1; and

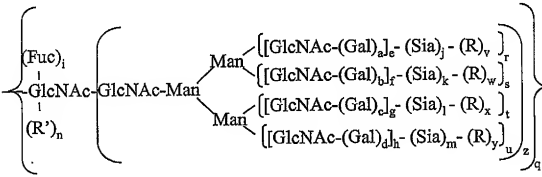
bb, cc, and dd are 0.

351. The method of claim 336, wherein

aa, bb, cc, dd, and ee are 0.

352. An anti-glycoprotein IIb/IIIa monoclonal antibody peptide conjugate formed by the method of claim 336.

353. A method of forming a conjugate between a chimeric anti HER2 antibody peptide and a modifying group, wherein said modifying group is covalently attached to said chimeric anti HER2 antibody peptide through an intact glycosyl linking group, said chimeric anti HER2 antibody peptide comprising a glycosyl residue having the formula:



wherein

a, b, c, d, i, j, k, l, q, r, s, t, u, and z are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers between 0 and 4;

n, v, w, x, and y are 0;

m is 0-20;

R is a modifying group, a mannose or an oligomannose; and

R' is a member selected from hydrogen and a glycosyl residue, and a modifying group,

said method comprising:

(a) contacting said chimeric anti HER2 antibody peptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

354. The method of claim 353, further comprising:

(b) prior to step (a), contacting said chimeric anti HER2 antibody peptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer said galactose to said chimeric anti HER2 antibody peptide.

355. The method of claim 353, further comprising:

(c) prior to step (a), contacting said chimeric anti HER2 antibody peptide with endoglycanase under conditions appropriate to cleave a glycosyl moiety from said chimeric anti HER2 antibody peptide.

356. The method of claim 353, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

357. The method of claim 353, wherein

a, c, and i are members independently selected from 0 and 1;

e, g, r, and t are 1;

b, d, f, h, j, k, l, m, n, s, u, v, w, x, and y are 0; and

q and z are 1.

358. The method of claim 353, wherein

i is 0 or 1;

q and z are 1; and

a, b, c, d, e, f, g, h, j, k, l, m, n, r, s, t, u, v, w, x, and y are 0.

359. The method of claim 353, wherein

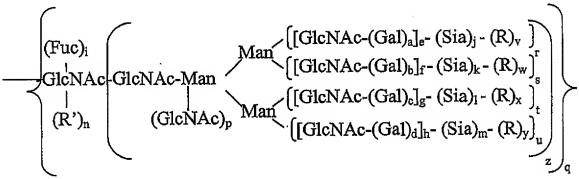
e, g, i, r, and t are members independently selected from 0 and 1;

a, b, c, d, f, h, j, k, l, m, n, s, u, v, w, x, and y are 0; and

q and z are 1.

360. An anti HER2 antibody peptide conjugate formed by the method of claim 353.

361. A method of forming a conjugate between an anti-RSV F peptide and a modifying group, wherein said modifying group is covalently attached to said anti-RSV F peptide through an intact glycosyl linking group, said anti-RSV F peptide comprising a glycosyl residue having the formula:



wherein

a, b, c, d, i, j, k, l, m, p, q, r, s, t, u, and z are members independently selected from 0 and 1;

e, f, g and h are members independently selected from the integers from 0 to 4;

n, v, w, x and y are 0;

R is a modifying group, a mannose or an oligomannose; and

R' is a member selected from H and a glycosyl residue, a glycoconjugate, and a modifying group

said method comprising:

(a) contacting said anti-RSV F peptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said

modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

362. The method of claim 361, further comprising:

(b) prior to step (a), contacting said anti-RSV F peptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer said galactose to said anti-RSV F peptide.

363. The method of claim 362, further comprising:

(c) prior to step (b), contacting said anti-RSV F peptide with endoglycanase under conditions appropriate to cleave a glycosyl moiety from said anti-RSV F peptide.

364. The method of claim 361, wherein

a, c, e, g and i are members independently selected from 0 and 1;

r and t are 1;

b, d, f, h, j, k, l, m, n, s, u, v, w, x and y are 0; and

z is 1.

365. The method of claim 361, wherein

a, b, c, d, e, f, g, h, j, k, l, m, r, s, t, u, v, w, x, y are 0;

i and p are independently selected from 0 or 1;

q and z are 1; and

n is 0.

366. The method of claim 361, wherein

e, g, i, r and t are members independently selected from 0 and 1;

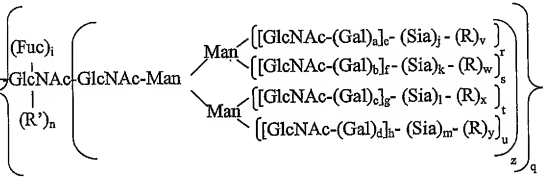
a, b, c, d, f, h, j, k, l, m, n, s, u, v, w, x and y are 0; and

q and z are 1.

367. The method of claim 361, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

368. An anti RSV F peptide conjugate formed by the method of claim 361.

369. A method of forming a conjugate between an anti-CD20 antibody peptide and a modifying group, wherein said modifying group is covalently attached to said anti-CD20 antibody peptide through an intact glycosyl linking group, said anti-CD20 antibody peptide having a glycosyl subunit comprising the formula:



wherein ,

a, b, c, d, i, j, k, l, m q, r, s, t, u and z are integers independently selected from 0 and 1;

e, f, g, and h are independently selected from the integers from 0 to 4;

n, v, w, x, and y are 0;

R is a modifying group, a mannose or an oligomannose; and

R' is a member selected from H, a glycosyl residue, a glycoconjugate or a modifying group,

said method comprising:

(a) contacting said anti-CD20 antibody peptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

370. The method of claim 369, said method further comprising:

(b) prior to step (a), contacting said anti-CD20 antibody peptide with a galactosyltransferase and a galactosyl donor under conditions appropriate for the transfer of said galactosyl donor to said anti-CD20 antibody peptide.

371. The method of claim 370, further comprising:

(c) prior to step (b), contacting said anti-CD20 antibody peptide with endoglycanase under conditions appropriate to cleave a glycosyl moiety from said anti-CD20 antibody peptide.

372. The method of claim 371, further comprising:

(d) prior to step (a), contacting said anti-CD20 antibody peptide with a mannosidase under conditions appropriate to remove mannose from said anti-CD20 antibody peptide.

373. The method of claim 369, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

374. The method of claim 369, wherein said glycosyltransferase is galactosyltransferase and said modified glycosyl donor is a modified galactosyl donor.

375. The method of claim 369, wherein

a, c, e, g and i are members independently selected from 0 and 1;

r, t, q and z are 1; and

b, d, f, h, j, k, l, m, n, s, u, v, w, x and y are 0.

376. The method of claim 369, wherein

a, c, e, g, i, q, r, and t are members independently selected from 0 and 1;

b, d, f, h, j, k, l, m, s, u, v, w, x, y are 0; and

z is 1.

377. The method of claim 369, wherein

e, g, i, q, r, and t are members independently selected from 0 and 1;

a, b, c, d, f, h, j, k, l, m, n, s, u, v, w, x, and y are 0; and
z is 1.

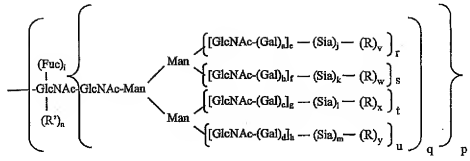
378. The method of claim 369, wherein
i is 0 or 1;
q and z are 1; and
a, b, c, d, e, f, g, h, j, k, l, m, n, r, s, t, u, v, w, x and y are 0.

379. The method of claim 369, wherein
e, g, i, r, t, v, x and z are members independently selected from 0 and 1;
a, b, c, d, f, h, j, k, l, m, n, s, u, w and y are 0; and
z is 1.

380. The method of claim 369, wherein
a, b, c, d, e, f, g, h, j, k, l, m, r, s, t, u, v, w, x and y are 0;
n and q are 1; and
i is 0 or 1.

381. An anti-CD20 antibody peptide conjugate formed by the method of claim 369.

382. A method of forming a conjugate between a recombinant DNase peptide and a modifying group, wherein said modifying group is covalently attached to said recombinant DNase peptide through an intact glycosyl linking group, said recombinant DNase peptide comprising a glycosyl residue having the formula:



wherein

a, b, c, d, i, n, p q, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers between 0 and 6;

j, k, l, and m are members independently selected from the integers between 0 and 100;

v, w, x, and y are 0; and

R is a member selected from polymer, a glycoconjugate, a mannose, an oligomannose and a modifying group.

said method comprising:

(a) contacting said recombinant DNase peptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

383. The method of claim 382, further comprising:

(b) prior to step (a), contacting said recombinant DNase peptide with a sialidase under conditions appropriate to remove sialic acid from said recombinant DNase peptide.

384. The method of claim 382, further comprising:

(c) contacting the product of step (a) with a sialyltransferase and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

385. The method of claim 382, further comprising:

(d) prior to step (a), contacting said recombinant DNase peptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer said galactose to said recombinant DNase peptide.

386. The method of claim 382, further comprising:

(e) prior to step (a) contacting said recombinant DNase peptide with a combination of a glycosidase and a sialidase.

387. The method of claim 382, further comprising:

(f) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

388. The method of claim 382, further comprising:

(g) prior to step (a), contacting said recombinant DNase peptide with N-acetylglucosamine transferase and a GlcNAc donor under conditions appropriate to transfer GlcNAc to said recombinant DNase peptide.

389. The method of claim 382, further comprising:

(h) prior to step (a), contacting said recombinant DNase peptide with an endoglycanase under conditions appropriate to cleave a glycosyl moiety from said recombinant DNase peptide.

390. The method of claim 382, wherein

a, b, c, d, i, j, k, l, m, q, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, h and p are 1; and

n, v, w, x, and y are 0.

391. The method of claim 382, wherein

a, b, c, d, e, f, g, h, i, j, k, l, m, q, r, s, t, and u are members independently selected from 0 and 1;

p is 1; and

n, v, w, x, and y are 0.

392. The method of claim 382, wherein

a, b, c, d, f, h, j, k, l, m, s, u, v, w, x, and y are 0; and

e, g, i, q, r, and t are members independently selected from 0 and 1; and

p is 1.

393. The method of claim 382, wherein

a, b, c, d, e, f, g, h, j, k, l, m, n, r, s, t, u, v, w, x, and y are 0;

i is 0 or 1; and

p is 1.

394. The method of claim 382, wherein

a, b, c, d, e, f, g, h, j, k, l and m are 0;

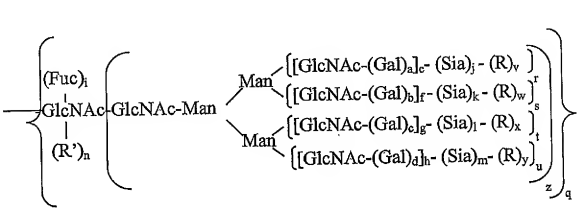
i, q, r, s, t, u, v, x and y are independently selected from 0 or 1;

p is 1; and

R is mannose or oligomannose.

395. A recombinant DNase peptide conjugate formed by the method of claim 382.

396. A method of forming a conjugate between an anti-tumor necrosis factor (TNF) alpha peptide and a modifying group, wherein said modifying group is covalently attached to said anti-TNF alpha peptide through an intact glycosyl linking group, said anti-TNF alpha peptide comprising a glycosyl residue having the formula:



wherein

a, b, c, d, i, n, o, p, q, r, s, t, u and z are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers between 0 and 6;

j, k, l, and m are members independently selected from the integers between 0 and 20;

n, v, w, x and y are 0; and

R is a modifying group, a mannose or an oligomannose;

R' is a glycoconjugate or a modifying group;

said method comprising:

(a) contacting said anti-TNF alpha peptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

397. The method of claim 396, further comprising:

(b) prior to step (a), contacting said anti-TNF alpha peptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer said galactose to said anti-TNF alpha peptide.

398. The method of claim 396, further comprising:

(c) prior to step (a), contacting said anti-TNF alpha peptide with endoglycanase under conditions appropriate to cleave a glycosyl moiety from said anti-TNF alpha peptide.

399. The method of claim 396, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

400. The method of claim 396, wherein

a, b, c, d, e, f, g, h, i, j, k, l, m, o, p, q, r, s, t and u are members independently selected from 0 and 1;

n is 1; and

v, w, x, y, and z are 0.

401. The method of claim 396, wherein

a, c, e, g and i are members independently selected from 0 and 1;

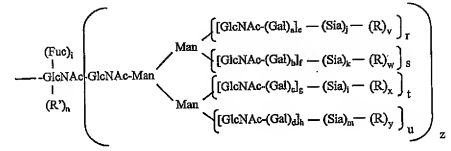
r and t are 1;

b, d, f, h, j, k, l, m, n, s, u, v, w, x and y; and

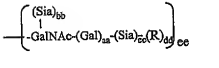
q and z are 1.

402. An anti-TNF alpha peptide conjugate formed by the method of claim 396.

403. A method of forming a conjugate between an insulin peptide and a modifying group, wherein said modifying group is covalently attached to said glycopeptide through an intact glycosyl linking group, said glycopeptide comprising a glycosyl residue having a formula which is a member selected from:



; and



wherein

a, b, c, d, i, j, k, l, m, r, s, t, u, z, aa, bb, cc, and ee are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integer between 0 and 4;

dd, n, v, w, x and y are 0;

R is a modifying group, a mannose or an oligomannose; and

R' is a member selected from H, a glycosyl residue, a modifying group and a glycoconjugate,

said method comprising:

(a) contacting said glycopeptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

404. The method of claim 403, further comprising:

(b) prior to step (a), contacting said glycopeptide with a sialidase under conditions appropriate to remove sialic acid from said glycopeptide.

405. The method of claim 403, further comprising:

(c) contacting the product of step (a) with a sialyltransferase and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

406. The method of claim 403, further comprising:

(d) prior to step (a), contacting said glycopeptide with N-acetylglucosamine transferase and a GlcNAc donor under conditions appropriate to transfer GlcNAc to said glycopeptide.

407. The method of claim 403, further comprising:

(e) prior to step (a), contacting said glycopeptide with Endo-H under conditions appropriate to cleave a glycosyl moiety from said glycopeptide.

408. The method of claim 403, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety and a glycoconjugate.

409. The method of claim 403, wherein

a, b, c, d, e, f, g, h, i, j, k, l, m, r, s, t, and u are members independently selected from 0 and 1;

n, v, w, x, and y are 0; and

z is 1.

410. The method of claim 403, wherein

a, b, c, d, e, f, g, h, j, k, l, m, n, s, t, u, v, w, x, and y are 0;

i and r are members independently selected from 0 and 1; and

z is 1.

411. The method of claim 403, wherein

a, b, c, d, e, f, g, h, i, j, k, l, m, and n are 0;

r, s, t, u, v, w, x, and y are members independently selected from 0 and 1; and

z is 1.

412. The method of claim 403, wherein

aa, bb, cc, and ee are members independently selected from 0 and 1; and

dd is 0.

413. The method of claim 403, wherein

aa and ee are members independently selected from 0 and 1; and

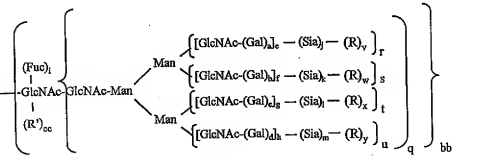
bb, cc, and dd are 0.

414. The method of claim 403, wherein

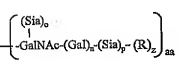
aa, bb, cc, dd, and ee are 0.

415. An insulin peptide conjugate formed by the method of claim 403.

416. A method of forming a conjugate between a hepatitis B surface antigen (HbsAg) peptide and a modifying group, wherein said modifying group is covalently attached to said HBsAg peptide through an intact glycosyl linking group, said HBsAg peptide comprising a glycosyl residue having a formula which is a member selected from:



; and



wherein

aa, bb, a, b, c, d, i, n, q, r, s, t, and u are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers between 0 and 6;

o, p, j, k, l, and m are members independently selected from the integers between 0 and 100;

cc, v, w, x, and y are 0;

R is a modifying group, a mannose or an oligomannose; and

R' is H or a glycosyl residue, a glycoconjugate, or a modifying group,

said method comprising:

(a) contacting said HBsAg peptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

417. The method of claim 416, further comprising:

(b) prior to step (a), contacting said HBsAg peptide with a sialidase under conditions appropriate to remove sialic acid from said HBsAg peptide.

418. The method of claim 416, further comprising:

(c) contacting the product of step (a) with a sialyltransferase and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

419. The method of claim 416, further comprising:

(d) prior to step (a), contacting said HBsAg peptide with a galactosidase under conditions appropriate to cleave a glycosyl residue from said HBsAg peptide.

420. The method of claim 416, further comprising:

(e) prior to step (a), contacting said HBsAg peptide with a galactosyl transferase and a

galactose donor under conditions appropriate to transfer said galactose to said HBsAg peptide.

421. The method according to claim 88, further comprising:

(f) contacting the product of step (d) with ST3Gal3 and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

422. The method of claim 416, further comprising:

(g) contacting the product from step (a) with a moiety that reacts with said modifying group, thereby forming a conjugate between said intact glycosyl linking group and said moiety.

423. The method of claim 416, further comprising:

(h) prior to step (a), contacting said HBsAg peptide with N-acetylglucosamine transferase and a GlcNAc donor under conditions appropriate to transfer GlcNAc to said HBsAg peptide.

424. The method of claim 416, further comprising:

(i) prior to step (a), contacting said HBsAg peptide with a mannosidase under conditions appropriate to cleave mannose from said HBsAg peptide.

425. The method according claim 1, further comprising:

(j) prior to step (a), contacting said HBsAg peptide with endoglycanase under conditions sufficient to cleave a glycosyl group from said HBsAg peptide.

426. The method of claim 416, wherein said modifying group is a member selected from a polymer, a toxin, a radioisotope, a therapeutic moiety, an adjuvant and a glycoconjugate.

427. The method of claim 416, wherein

a, b, c, d, i, j, k, l, m, o, p, q, r, s, t, u, and aa are members independently selected from 0 and 1;

bb, e, f, g, h, and n are 1; and

cc, v, w, x, y, and z are 0.

428. The method of claim 416, wherein

a, b, c, d, i, j, k, l, m, n, o, p, q, r, s, t, u, and aa are members independently selected from 0 and 1;

e, f, g, and h are independently selected from 0, 1, 2, 3, or 4;

cc, v, w, x, y, and z are 0; and

bb is 1.

429. The method of claim 416, wherein

cc, a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, v, w, x, y and z are 0; and

q, r, s, t, u, v, w, x, y, and aa are members independently selected from 0 and 1; and

bb is 1.

430. The method of claim 416, wherein

a, b, c, d, i, j, k, l, m, o, q, r, s, t, u, and aa are members independently selected from 0 and 1;

bb, e, f, g, h, and n are 1; and

n, p cc, v, w, x, y, and z are 0.

431. The method of claim 416, wherein

bb, a, b, c, d, e, f, g, h, i, j, k, l, m, o, p, q, r, s, t, u, v, w, x, y, and z are members independently selected from 0 and 1;

cc is 1; and

n is 0 or 1.

432. The method of claim 416, wherein

a, b, c, d, f, h, j, k, l, m, o, p, s, u, v, w, x, y, z, and cc are 0;

bb is 1;

e, g, i, n, q, r, t, and aa are members independently selected from 0 and 1.

433. The method of claim 416, wherein

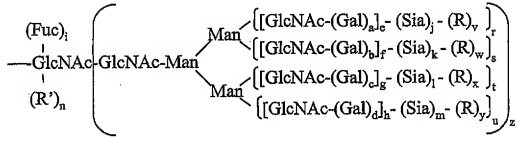
a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, z, and cc are 0;

q, r, s, t, u, v, w, x, y, and aa are members independently selected from 0 and 1; and

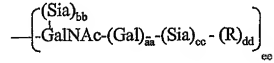
bb is 1.

434. A HBsAg peptide conjugate formed by the method of claim 416.

435. A method of forming a conjugate between a human growth hormone (HGH) peptide and a modifying group, wherein said modifying group is covalently attached to said glycopeptide through an intact glycosyl linking group, said glycopeptide comprising a glycosyl residue having a formula which is a member selected from:



; and



wherein

a, b, c, d, i, j, k, l, m, r, s, t, u, z, aa, bb, cc, and ee are members independently selected from 0 and 1;

e, f, g, and h are members independently selected from the integers between 0 and 4;

n, v, w, x, y, and dd are 0;

R is a modifying group, a mannose or an oligomannose; and

R' is a member selected from H, a glycosyl residue, a modifying group and a glycoconjugate,

said method comprising:

(a) contacting said glycopeptide with a glycosyltransferase and a modified glycosyl donor, comprising a glycosyl moiety which is a substrate for said glycosyltransferase covalently bound to said modifying group, under conditions appropriate for the formation of said intact glycosyl linking group.

436. The method of claim 435, further comprising:

(b) prior to step (a), contacting said glycopeptide with a sialidase under conditions appropriate to remove sialic acid from said glycopeptide.

437. The method of claim 435, further comprising:

(c) prior to step (a), contacting said glycopeptide with endoglycanase under conditions appropriate to cleave a glycosyl moiety from said glycopeptide.

438. The method of claim 435, further comprising:

(c) prior to step (a), contacting said glycopeptide with a galactosyl transferase and a galactose donor under conditions appropriate to transfer said galactose to said glycopeptide.

439. The method of claim 435, further comprising:

(d) contacting the product of step (a) with a sialyltransferase and a sialic acid donor under conditions appropriate to transfer sialic acid to said product.

440. The method of claim 435, further comprising:

(d) prior to step (a), contacting said glycopeptide with a galactosidase under conditions appropriate to cleave a glycosyl residue from said glycopeptide.

441. The method of claim 435, wherein

a, b, c, d, e, f, g, h, i, j, k, l, m, r, s, t, and u are members independently selected from 0 and 1;

n, v, w, x, and y are 0; and
z is 1.

442. The method of claim 435, wherein
a, b, c, d, e, f, g, h, j, k, l, m, n, s, t, u, v, w, x, and y are 0;
i and r are members independently selected from 0 and 1; and
z is1.

443. The method of claim 435, wherein
a, b, c, d, e, f, g, h, i, j, k, l, m, and n are 0;
r, s, t, u, v, w, x and y are members independently selected from 0 and 1; and
z is 1.

444. The method of claim 435, wherein
aa and ee are members independently selected from 0 and 1; and
bb, cc, and dd are 0.

445. The method of claim 435, wherein
aa, bb, cc, dd, and ee are 0.

446. The method of claim 435, wherein
aa, bb, cc, dd, ee, and n are 0.

447. A HGH peptide conjugate formed by the method of claim 435.